

WHAT IS CLAIMED IS:

1. A coagulating sedimentation apparatus for precipitating and separating suspended solids, coagulated flocs or the like in a liquid to be treated, so as to clarify said liquid, said sedimentation apparatus comprising:

a sedimentation tank;

a mixing chamber vertically disposed within said tank concentrically therewith, for introducing and mixing said liquid and an additive therein;

a cup-shaped rotary support disposed adjacent a lower end of said mixing chamber so as to act as a bottom of said mixing chamber, said rotary support being rotated about a center axis of said mixing chamber and having a bottom portion formed with an opening;

a discharge pipe extending outward from an outer peripheral surface of said rotary support, communicating with the inside of said rotary support, and having a tubular wall provided with a discharge orifice, said discharge pipe being for distributing said liquid from said mixing chamber into a sedimentation space between said tank and said mixing chamber; and

a blade fixed with respect to said mixing chamber and adapted to discharge a precipitate deposited on the bottom portion of said rotary support from said opening to the outside of said rotary support.

2. A coagulating sedimentation apparatus according to claim 1, further comprising:

a mixer device disposed within said mixing chamber and adapted to rotate about the center axis of said mixing chamber, for mixing and stirring said liquid and additive; and

a center shaft disposed so as to penetrate through said mixer device and adapted to rotate about the center axis of said mixing chamber,

said rotary support fixed to said center shaft. rotary support.

3. A coagulating sedimentation apparatus according to claim 1, further comprising a shortcut preventing member disposed under said opening and adapted to rotate together with said rotary support, for blocking a flow of said liquid flowing out through said opening from said mixing chamber and rotary support.

4. A coagulating sedimentation apparatus according to claim 1, further comprising:

a shortcut preventing member disposed above said opening and adapted to rotate together with said rotary support, for blocking a flow of said liquid directed from said mixing chamber toward said opening; and

a blade fixed with respect to said mixing chamber, for brushing off a precipitate deposited on said shortcut preventing member.

5. A coagulating sedimentation apparatus according to claim 1, further comprising:

a conduit connected to said mixing chamber, for introducing said liquid into said mixing chamber; and

5 a receiving chamber formed along an inner peripheral surface of said mixing chamber, for receiving said liquid from said conduit and causing said liquid to flow from said receiving chamber into said mixing chamber.

6. A coagulating sedimentation apparatus according to claim 5, wherein said receiving chamber is defined by the inner peripheral surface of said mixing chamber, an annular member fixed to the inner peripheral face of said mixing chamber, and a tubular member fixed to an inner edge of said annular member.

15 7. A coagulating sedimentation apparatus according to claim 6, wherein said annular member is positioned lower than said conduit, and wherein said tubular member has an upper edge positioned higher than said conduit.

20 8. A coagulating sedimentation apparatus according to claim 5, wherein said receiving chamber has a bottom portion formed with a discharge port for discharging a precipitate deposited within said receiving chamber.

25 9. A coagulating sedimentation apparatus according to claim 8, wherein said discharge port has

a total area which is  $1/4$  to  $1/2$  of the area of the bottom surface of said receiving chamber.

10. A coagulating sedimentation apparatus according to claim 1, further comprising a plurality of annular troughs concentrically arranged in an upper portion of said tank.

11. A coagulating sedimentation apparatus according to claim 10, wherein said plurality of annular troughs are positioned and dimensioned such that weir parts of all said plurality of annular troughs into which a supernatant in said sedimentation space within said tank spills out have a substantially identical overflow liquid load.

12. A coagulating sedimentation apparatus according to claim 10, wherein said plurality of annular troughs comprise an annular trough with a larger diameter disposed along a side wall of said tank, and an annular trough with a smaller diameter disposed in an intermediate portion between said side wall of said tank and said mixing chamber.

13. A coagulating sedimentation apparatus according to claim 12, wherein said plurality of annular troughs are positioned and dimensioned so as to satisfy the following expression:

$$\frac{\pi\{D_1^2 - [(D_2 + D_3)/2]^2\}}{\pi D_2} = \frac{\pi\{(D_2 + D_3)/2]^2 - [(D_3 + D_4)/2]^2\}}{\pi D_3}$$

$$= \frac{\pi\{(D_3 + D_4)/2]^2 - R_1^2\}}{\pi D_4}$$

where  $D_1$  is the inside diameter of the side wall of the tank,  $D_2$  is the inside diameter of the inner weir part of the annular trough with a larger diameter,  $D_3$  is the outside diameter of the outer weir part of the annular trough with a smaller diameter, and  $D_4$  is the inside diameter of the inner weir part of the annular trough with a smaller diameter, and  $R_1$  is the outside diameter of the mixing chamber.

14. A coagulating sedimentation apparatus according to claim 1, further comprising a member secured to a mixer device, for supporting a center shaft.